DR-20

NEW DYAD FROM RENEWABLE SOURCE FOR APPLICATIONIN ORGANIC SOLARCELLS

A. V. Pedroso , J. R. Garcia

Department of Chemistry, State University of Ponta Grossa, 1551 Carlos Cavalcanti Av., Uvaranas, Ponta Grossa – PR, 84030-900, Brazil
E-mail: alexvieirapedroso@gmail.com

Abstract. Nowadays, issues involving renewable forms of energy production have become frequent when it comes to sustainable development. Among the alternative energies, solar energy has gained great interest in recent years, which has led to a huge evolution in the production of solar panels, through the development of new materials, more efficient and lower cost devices. Based on this, this work focuses on the development of organic materials with semiconductor characteristics to act as active layer in organic photovoltaic devices. The aim is to obtain lower cost materials using renewable sources (such as cardanol: 3 - [(8Z, 11Z) -pentadeca-8,11,14-trien-1-yl] -phenol), relative ease of production, easy processing, the possibility of producing flexible and light photovoltaic devices.

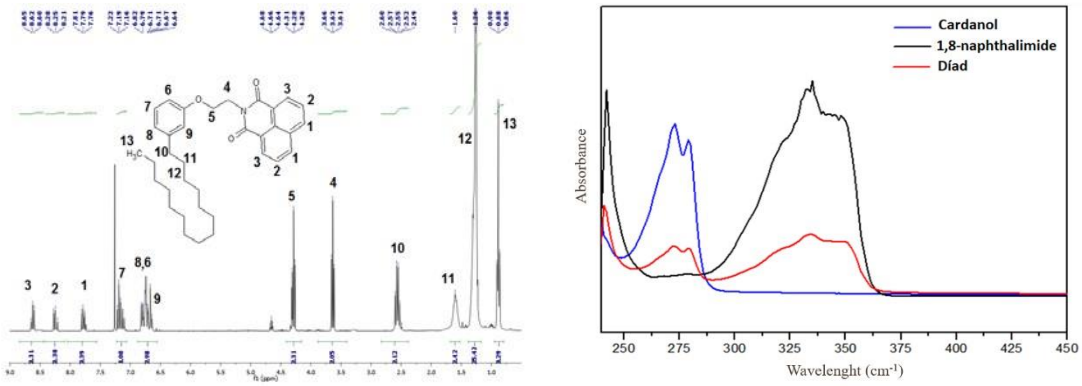

Figure 1: a) Structure and NMR ^{1}H characterization b) UV-vis characterization

It was observed that the synthetized dyad has absorption in the ultraviolet region. The photovoltaic analysis in DSSC devices showed an increase in photovoltaic parameters when the dyad was inserted together with the dye Z719, with an increase of 12% efficiency.

Table 1: Photovoltaic parameters

Device	V_{OC} (V)	J_{SC} (A/cm²)	FF (%)	η (%)	Maximum power (w)	
1	-0,00702	$5{,}92.10^{-7}$	21,53	$8{,}94.10^{-6}$	$8{,}94.10^{-10}$	TiO_2
2	-0,30762	$2{,}82.10^{-4}$	30,85	0,41885	$3{,}35.10^{-5}$	Dye Z719
3	-0,03418	$5{,}41.10^{-6}$	36,39	0,00135	$1{,}08.10^{-7}$	Dyad
4	-0,32959	$4{,}00.10^{-4}$	28,37	0,46181	$4{,}15.10^{-5}$	Dye + Díade

References

1. Roncali, J; Grosu, I., *Advanced Science*, 2019, **1**, 1801026.
2. Nishizawa, T., LIM, H. K., *et al.*, *Chemical Communications*, 2009, **1**, 2469–2471.
3. Bhattacharya, S; Chowdhury, J*; et al*., *Journal of Luminescence*, 2010, **130**, 1924–1934.

This work was supported by the Araucária Foundation, a Research Founding Agency from Paraná State – Brazil, CAPES and CNPq.